CLAIMS

I claim:

1. A thermoplastic laminated article comprising:

   a. a first thermoplastic layer selected from the group consisting of polyester and polycarbonate and having first and second surfaces;

   b. a second thermoplastic layer selected from the group consisting of polyethylene and polypropylene and having a third surface disposed toward said first surface; and

   c. a bonding agent disposed between said first and third surfaces for securing said first thermoplastic layer and said second thermoplastic layer.

2. The thermoplastic laminated article of claim 1 wherein said first thermoplastic layer has a thickness of from about 0.127 mm to about 24.1 mm.

3. The thermoplastic laminated article of claim 2 wherein said polyester has an inherent viscosity of from about 0.5 to about 1.2 dL/g.

4. The thermoplastic laminated article of claim 3 wherein said polyester has a diol component comprising from 67 to 75 mole % ethylene glycol and from 33 to 25 mole % 1,4-cyclohexanedimethanol.

5. The thermoplastic laminated article of claim 1 wherein said second layer is polyethylene.

6. The thermoplastic laminated article of claim 5 wherein said second thermoplastic layer is a thermoplastic fabric composed of polyethylene fibers having a thickness of from about 0.001 mm to about 10 mm.

7. The thermoplastic laminated article of claim 6 wherein said polyethylene fibers have a thickness of from about 0.01 mm to about 5 mm.

8. The thermoplastic laminated article of claim 6 wherein said polyethylene fibers have a thickness of from about 0.2 mm to about 3 mm.

9. The thermoplastic laminated article of claim 6 wherein said polyethylene has a density of from about 0.86 g/cm^3 to about 1.05 g/cm^3.

10. The thermoplastic laminated article of claim 6 wherein said thermoplastic fabric is a woven fabric.

11. The thermoplastic laminated article of claim 6 wherein said thermoplastic fabric is a non-woven fabric.

12. The thermoplastic laminated article of claim 6 wherein said fabric further comprises bicomponent fibers having a sheath and core configuration, and wherein said sheath is a polyolefinic material selected from polyethylene and polypropylene.

13. The thermoplastic laminated article of claim 1 wherein said first layer is a polyester and said second layer is a woven polyethylene fabric composed of polyethylene fibers having a thickness of from about 0.2 to about 3 mm.

14. The thermoplastic laminated article of claim 1 further comprising:

d. a third thermoplastic layer having a fourth surface disposed toward said second surface; and

e. a second bonding agent disposed between said second and fourth surfaces for securing said first thermoplastic layer and said third thermoplastic layer.

15. The thermoplastic laminated article of claim 1 wherein said bonding agent is an adhesive selected from the group consisting of polyurethanes, polyethylene, vinyl alcohols, acrylics and mixtures thereof.

16. A thermoplastic laminated article comprising:

a. a first thermoplastic layer having a first and second surfaces;

b. a second thermoplastic layer having a third surface disposed toward said first surface; and

c. a bonding agent disposed between said first and third surfaces for securing said first thermoplastic layer and said second thermoplastic layer, wherein said first thermoplastic layer is a polyester having an inherent viscosity of

from about 0.5 to about 1.2 dL/g and said second thermoplastic layer is a polyolefinic material selected from polyethylene and polypropylene.

17. The thermoplastic laminated article of claim 16 wherein said polyester has a diol component comprising from 67 to 75 mole % ethylene glycol and from 33 to 25 mole % 1,4-cyclohexanedimethanol.

18. The thermoplastic laminated article of claim 16 wherein said second thermoplastic layer is a woven thermoplastic fabric composed of polyethylene fibers having a thickness of from about 0.2 to about 3 mm and a density of from about 0.86 g/cm^3 to about 1.05 g/cm^3.

19. The thermoplastic laminated article of claim 16 wherein said fabric further comprises bicomponent fibers having a sheath and core configuration, and wherein said sheath is polyethylene having a density of from about 0.86 g/cm^3 to about 1.05 g/cm^3.

20. A method for making thermoplastic laminated article comprising the steps of:

a. providing a thermoplastic first layer having first and second surfaces, and a second thermoplastic layer having a third surface disposed toward said first surface;

b. applying a bonding agent onto at least one of said first or third surfaces;

c. placing the first thermoplastic layer and second thermoplastic layer in a superposed relationship with said bonding agent between said layers; and

d. applying sufficient heat and pressure to said second surface and an outer surface of said second thermoplastic layer to cause the bonding agent to flow and spread between said first and third surfaces to form a substantially continuous layer and to form a bond between said first thermoplastic layer and said second thermoplastic layer.

21. The method of claim 20 wherein step (c) includes hot press bonding conducted at a temperature of about 175°F. to about 340°F., (80°C to about 171°C), and a pressure of 40 psi to 110 psi (2.81 kg/cm^2 to 7.73 kg/cm^2), followed by cold press bonding

conducted at a temperature of about 70°F. to about 340°F (21°C to about 171°C), and a pressure of about 13 psi to about 500 psi (0.9 kg/cm^2 to about 35.1 kg/cm^2).

22. The method of claim 19 wherein said hot press bonding is conducted at a temperature of about 200°F. to 255°F., (93°C to 124°C), and a pressure of 90 psi to 100 psi (6.33 kg/cm^2 to 7.03 kg/cm^2), and said cold press bonding is conducted at a temperature of about 100°F. to about 130°F (37.7°C to 54.4°C), and a pressure of about 100 psi to about 250 psi (7.03 kg/cm^2 to 17.57 kg/cm^2).

23. The method of claim 20 further comprising securing said second thermoplastic layer in a retaining means to prevent the second thermoplastic layer from shrinking during hot press bonding.

24. A method for making thermoplastic laminated article comprising the steps of:

a. providing a polyester first layer having first and second surfaces;

b. applying a bonding agent to said first surface;

c. providing a polyolefin second layer in a superposed relationship with said first layer, wherein said polyolefin second layer has a third surface disposed toward said first surface, and wherein said polyolefin second layer is substantially fixedly restrained by a retaining means;

d. applying sufficient heat and pressure to said second surface and an outer surface of said polyolefin second layer to cause the bonding agent to flow and spread between said first and third surfaces to form a substantially continuous layer and to form a bond between said first thermoplastic layer and said second thermoplastic layer.

25. The method of claim 24 wherein said retaining means comprises a metal plate and said second layer wraps said metal plate and exposed edges of the polyolefin fabric are substantially aligned and affixed together.

26. The method of claim 24 wherein said retaining means comprises a tenter frame.

27. The method of claim 25 further comprises providing a paper layer adjacent to a surface of said metal plate, a second paper layer adjacent to said second surface, a

second metal plate adjacent to said second paper layer and a pressure pad adjacent to said second metal plate, wherein said paper layers, second metal plate and pressure pad are in a substantially superposed layered configuration.

28. The method of claim 27 wherein step (d) includes hot press bonding conducted at a temperature of about 175°F. to about 340°F., (80°C to about 171°C), and a pressure of 40 psi to 110 psi (2.81 kg/cm^2 to 7.73 kg/cm^2), followed by cold press bonding conducted at a temperature of about 70°F. to about 340°F (21°C to about 171°C), and a pressure of about 13 psi to about 500 psi (0.9 kg/cm^2 to about 35.1 kg/cm^2).

29. The method of claim 27 wherein said polyolefin fabric is a woven polyethylene fabric composed of polyethylene fibers having a thickness of from about 0.2 to about 3 mm and a density of from about 0.86 g/cm^3 to about 1.05 g/cm^3.

30. The method of claim 27 wherein prior to step (d) said third surface is corona treated.